Project-Lesson C

**Reporting Category** Probability and Statistics

**Topic** Measure of central tendency/Introduction to PBL

**Duration 90 Minutes**

**Primary SOL** 6.15 The student will

a) describe mean as balance point; and

b) decide which measure of center is appropriate for a given purpose.

# Websites/Resources

* Google Docs- <https://drive.google.com>
* Survey Monkey <http://www.surveymonkey.com>
* GO Animate- <http://goanimate.com/>
* YouTube.com <http://youtube.com>

# Materials

* Laptop
* Calculator
* Index Cards

# Vocabulary

Measure of center, mean, median, mode, fair share (earlier grades)

balance point (6.15)

**Technology Standard**

*Research and Information Fluency* -Students apply digital tools to gather, evaluate, and use information. Students: a. plan strategies to guide inquiry. b. locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media. c. evaluate and select information sources and digital tools based on the appropriateness to specific tasks. d. process data and report results.   
*Critical Thinking, Problem Solving, and Decision Making* -Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. Students: a. identifies and defines authentic problems and significant questions for investigation. b. plan and manage activities to develop a solution or complete a project. c. collect and analyze data to identify solutions and/or make informed decisions. d. use multiple processes and diverse perspectives to explore alternative solutions.

* **Content Standard:** Virginia SOL 6.15 the student will be able to: a). describe mean as balance point; and b) decide which measure of center is appropriate for a given purpose.
* SOL 6.14 The student, given a problem situation, will a) construct circle graphs; b) draw conclusions and make predictions, using circle graphs; and c) compare and contrast graphs that present information from the same data set.
* **Prerequisite Skills:** Virginia 5.15 collect/organize/interpret data, using stem-and-leaf plots/line graphs and 5.16 a) describe mean/median/mode; b) describe mean as fair share; c) find the mean/median/ mode/range; d) describe range as measure of variation.
* **Objectives, Outcomes, or Framing Question:** The students will work as a team to determine which item from their category should be sold in the school’s snack store.
  + Which measure of central tendency is the best to measure which item should be sold in the school’s store? Explain.
  + If you had more students or teachers to respond to your question do you think the outcome would be the same? Explain.

# Group-Students are strategically placed in groups of fours. Groups we selected by the teacher and vary in the level of skills for each team. Each group consists of two higher level performing students, 1 lower level student and on middle performing students. The teacher will provide any students with an IEP their accommodations as well as ESL students. The majority of the students with an IEP has the accommodation for use of a calculator and a graphic organizer. The teacher will post the groups on the board for the students to view. Each group member has a specific duty. The teacher will assign these duties to the students based on the way she orders them when the teams are presented.

* Recorder: Student 1
* Time keeper: Student 2
* Task Keeper: Student 3
* Spokes person: Student 4

# Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

Teacher must ensure that all students completed their homework from the previous class-the students were to ask 20 students and faculty member which item they you like from their group’s category to be sold at the school store. The students could’ve used Google survey, Text Messages, or paper and pencil to conduct their survey.

1. Teacher walks around the room to ensure that all students have their homework. The teacher will have a completed survey for students without their assignments for each category/team. The teacher will deduct points off for any student not completing their homework assignment.
2. The teacher presents the problem to the students, explains the rubric, and then allows them to move into their groups.

**Problem Selection:** Fairfield Middle School is considering opening a snack store to run before and after school. The school needs help to determine the type of soft drinks, chips, candy, and cookies to sale to the students and staff. Using data analysis each group will be responsible for selecting the top two items to sale for each category.

|  |  |  |  |
| --- | --- | --- | --- |
| Group A: Soft Drinks | Group B: Chips | Group C: Candy | Group D: Cookies |
| Cola | Potato Chips (Plain) | M&Ms | Oatmeal Cookies |
| Lime | BBQ chips | Starburst | Chocolate Chip Cookies |
| Grape | Sour Cream and Onion Chips | Skittles | Peanut Butter Cookies |
| Orange | Salt and Vinegar Chips | Fruit chewable | Sugar Cookies |
| Fruit Punch | Doritos | Jolly Ranchers | Macadamia Cookies |

|  |  |  |  |
| --- | --- | --- | --- |
|  | 3 | 2 | 1 |
| **Collaboration- Cooperation** | Student follows teams’ rules, offers advice to teammates, and accepts advice from teammates and the teacher. | Student follows team rules and accepts advice from teammates and the teacher. | Student does not follow team rules, does not help his/her teammates and does not follow advice from teammates and the teacher. |  |
| **Collaboration – Participation** | Student is actively involved in planning, preparing and presenting the project. Student plays a key role in the team’s presentation. | Student is actively involved in planning, preparing, and presenting the project. Student participates in team’s presentation. | Student refuses to be actively involved in planning, preparing, and presenting the project. Student does not participate in teams’ presentation. |  |
| **Collaboration- Contribution** | A student contributes to the brainstorming activity and provides suggestions and strategies on how to find the solutions to determine which items should be sold at the school store. | Students contributes some to the brainstorming activity and provide some suggestions and strategies on how to find the solutions to determine which items should be sold at the school store. | Students contribute little to the brainstorming activity and provide no suggestions and strategies on how to find the solutions to determine which items should be sold at the school store |  |
| **Problem Recognition** | Student demonstrates the ability to identify the problem as to collect, analyze, and make inference from a data set. | Student demonstrates some ability to identify the problem as to collect, analyze, and make inference from a data set with help from his teammate or teacher. | Student demonstrates little to no ability to identify the problem as to collect, analyze, and make inference from a data set even with help from his teammate or teacher |  |
| **Creative Thinking in Problem Solving** | The student uses critical thinking skills to plan and conduct research and make informed decisions using appropriate digital tools and resources. | The student uses some critical thinking skills to plan and conduct research and make informed decisions using appropriate digital tools and resources set with help from his teammate or teacher. | The student lack critical thinking skills to plan and conduct research and make informed decisions using appropriate digital tools and resources set with help from his teammate or teacher |  |
| **Learning Outcome** | Student demonstrates an understanding of information that is relevant, fosters higher-leverage thinking, and directly relates to VA SOL 6.15. | Student demonstrates some understanding of information that is relevant, fosters higher-leverage thinking, and directly relates to VA SOL 6.15. | Student demonstrates little understanding of information that is relevant, fosters higher-leverage thinking, and directly relates to VA SOL 6.15. |  |

|  |  |  |  |
| --- | --- | --- | --- |
|  | 3 | 2 | 1 |
| **Technology Standards (Research and information fluency A.)** | Student applied digital tools to gather, evaluate, and use information. | Student applied some digital tools to gather, evaluate, and use information. | Student applied no digital tools to gather, evaluate, and use information. |  |
| **Technology Standards (Research and information fluency B.)** | Student used social media or forums to collect and ethically use information from a combination of 50 students and staff. | Student used some technology to collect and ethically use information from a combination of 50 students and staff. | Student used no technology to collect and ethically use information from a combination of 50 students and staff. . |  |
| **PowerPoint Presentation A.** | The presentation shows a visual display of the data using a bar graph, circle graph, and a histogram. | The presentation shows a visual display of data using one or more of the following: using a bar graph, circle graph, and a histogram. | The presentation shows no visual display of the data using a bar graph, circle graph, and a histogram. |  |
| **PowerPoint Presentations B.** | PowerPoint layout (font, color scheme, and graphics) are neat, clear, and consistent throughout all slides. (EXCELLENT=3) | PowerPoint layout (font, color scheme, and graphics) are neat, clear, and consistent throughout all slides. (ACCEPTABLE=2) | PowerPoint layout (font, color scheme, and graphics) are neat, clear, and consistent throughout all slides. (NOT ACCEPTABLE=1) |  |
| **Oral presentation** | Student creatively presented their Candy store supply list using a visual display (PowerPoint, Video Commercial, Poster Board) by including possible scenarios of how the snack store would look and the items to be sold-supported by data collection.  (EXCELLENT=3) | Student creatively presented their Candy store supply list using a visual display (PowerPoint, Video Commercial, Poster Board) by including possible scenarios of how the snack store would look and the items to be sold-supported by data collection.  (ACCEPTABLE=2) | Student creatively presented their Candy store supply list using a visual display (PowerPoint, Video Commercial, Poster Board) by including possible scenarios of how the snack store would look and the items to be sold-supported by data collection.  (NOT ACCEPTABLE=1) | . |
| **Total** |  |  |  | /33 |

1. The teacher explains the project to the students with the following details:
2. All students must collect a survey from 20 teachers/staff on the one item that they would like to see sold in the school’s store- from their groups’ category. (Homework the class before)
3. The students are to use a spreadsheet to collect all of their team member’s data.
4. After the spread sheet is complete the team must find out which item they will recommend to be sold in school’s store-they must back up their recommendation using their knowledge of the topic measure of central tendency
5. The teacher uses an observation folder to collect data on the progress of each team and each member as she walks around the class.
6. Once the students have a consensus on the item that they will recommend-they must work together to creatively present their findings. They may use a video, [www.goanimate.com](http://www.goanimate.com), a poster board, or PowerPoint. The must ensure that they meet all of the requirements that are on the rubric.
7. Once the projects are complete-each team will present their work and will be scored by their peers.

# Assessment

* + Questions
* Each student will use the rubric to grade their peers.

# Strategies for Differentiation

* Provide alternative resources for students to create their presentation.
* Show each team how to use some of the formulas on the spreadsheet to help them with their calculations.